

plications, in addition to securing the component(s), snap rings of varying thickness also determine end play. These are usually called selective snap rings.

Two basic types of snap rings are used: machined and stamped snap rings. Machined snap rings (**Figure 7**) can be installed in either direction since both faces have sharp edges. Stamped snap rings (**Figure 8**) are manufactured with a sharp edge and a round edge. When installing a stamped snap ring in a thrust application, install the sharp edge facing away from the part producing the thrust.

E-clips are used when it is not practical to use a snap ring. Remove E-clips with a flat blade screwdriver by prying between the shaft and E-clip. To install an E-clip, center it over the shaft groove, and push or tap it into place.

Observe the following when installing snap rings:

1. Remove and install snap rings with snap ring pliers. See *Snap Ring Pliers* in this chapter.
2. In some applications, it may be necessary to replace snap rings after removing them.
3. Compress or expand snap rings only enough to install them. If overly expanded, they lose their retaining ability.
4. After installing a snap ring, make sure it seats completely.
5. Wear eye protection when removing and installing snap rings.

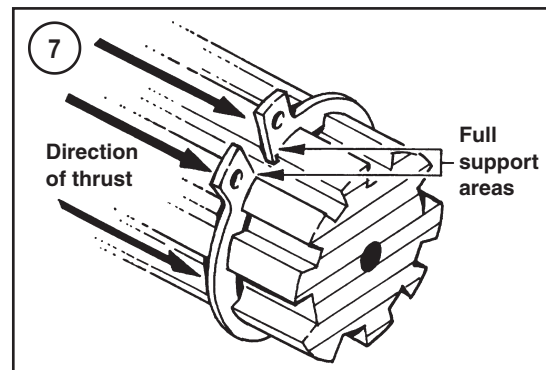
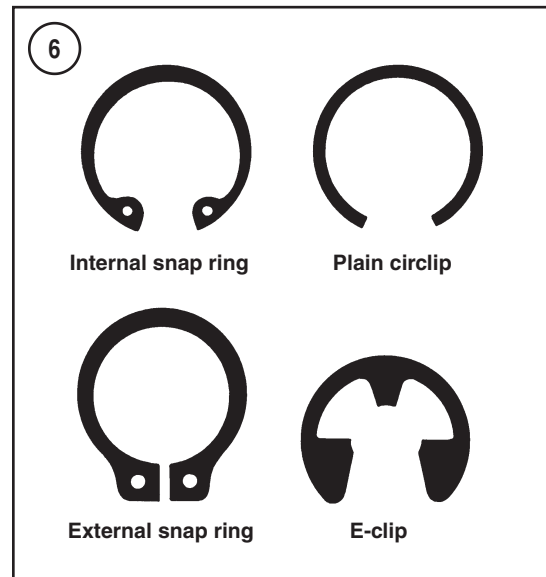
SHOP SUPPLIES

Lubricants and Fluids

Periodic lubrication helps ensure a long service life for any type of equipment. Using the correct type of lubricant is as important as performing the lubrication service, although in an emergency the wrong type of lubricant is better than none. The following section describes the types of lubricants most often required. Make sure to follow the manufacturer's recommendations for lubricant types.

Engine oil

Engine oil is classified by two standards: the American Petroleum Institute (API) service classification and the Society of Automotive Engineers

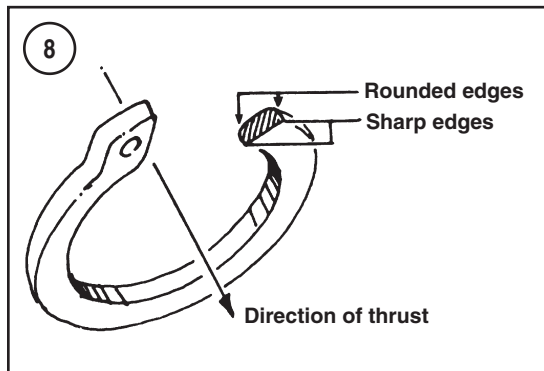


(SAE) viscosity rating. This information is on the oil container label. Two letters indicate the API service classification. The number or sequence of numbers and letter (10W-40 for example) is the oil's viscosity rating. The API service classification and the SAE viscosity index are not indications of oil quality.

The service classification indicates that the oil meets specific lubrication standards. The first letter in the classification (*S*) indicates that the oil is for gasoline engines. The second letter indicates the standard the oil satisfies.

Always use an oil with a classification recommended by the manufacturer. Using an oil with a different classification can cause engine damage.

Viscosity is an indication of the oil's thickness. Thin oils have a lower number while thick oils have



a higher number. Engine oils fall into the 5- to 50-weight range for single-grade oils.

Most manufacturers recommend multigrade oil. These oils perform efficiently across a wide range of operating conditions. Multigrade oils are identified by a (W) after the first number, which indicates the low-temperature viscosity.

Engine oils are most commonly mineral (petroleum) based; however, synthetic and semi-synthetic types are used more frequently. When selecting engine oil, follow the manufacturer's recommendation for type, classification and viscosity.

Greases

Grease is an oil to which a thickening base has been added so the end product is semi-solid. Grease is often classified by the type of thickener added, such as lithium soap. The National Lubricating Grease Institute (NLGI) grades grease. Grades range from No. 000 to No. 6, with No. 6 being the thickest. Typical multipurpose grease is NLGI No. 2. For specific applications, manufacturers may recommend water-resistant type grease or one with an additive such as molybdenum disulfide (MoS_2).

Brake fluid

Brake fluid is the hydraulic fluid used to transmit hydraulic pressure (force) to the wheel brakes. Brake fluid is classified by the Department of Transportation (DOT). Current designations for brake fluid are DOT 3, DOT 4 and DOT 5. This classification appears on the fluid container.

Each type of brake fluid has its own definite characteristics. Do not intermix different types of brake fluid. DOT 5 fluid is silicone-based. DOT 5 is not

compatible with other fluids or in systems for which it was not designed. Mixing DOT 5 fluid with other fluids may cause brake system failure. When adding brake fluid, *only* use the fluid recommended by the ATV manufacturer.

Brake fluid will damage plastic, painted or plated surfaces. Use extreme care when working with brake fluid. Immediately wash any spills with soap and water. Rinse the area with plenty of clean water.

Hydraulic brake systems require clean and moisture-free brake fluid. Never reuse brake fluid. Brake fluid absorbs moisture, which greatly reduces its ability to perform correctly. Keep brake fluid containers and reservoirs properly sealed. Purchase brake fluid in small containers, and discard any small left-over quantities properly. Do not store a container of brake fluid with less than 1/4 of the fluid remaining. This small amount absorbs moisture very rapidly.

WARNING

Never put a mineral-based (petroleum) oil into the brake system. Mineral oil will cause rubber parts in the system to swell and break apart, resulting in complete brake failure.

Cleaners, Degreasers and Solvents

Many chemicals are available to remove oil, grease and other residue from the ATV. Before using cleaning solvents, consider how they will be used and disposed of, particularly if they are not water-soluble. Local ordinances may require special procedures for the disposal of various cleaning chemicals. Refer to *Safety* in this chapter for more information on their use.

Generally, degreasers are strong cleaners used to remove heavy accumulations of grease from engine and frame components.

Use brake parts cleaner to clean brake system components when contact with petroleum-based products will damage seals. Brake parts cleaner leaves no residue.

Use electrical contact cleaner to clean electrical connections and components without leaving any residue.

Carburetor cleaner is a powerful solvent used to remove fuel deposits and varnish from fuel system components. Use this cleaner carefully, as it may damage finishes.

Most solvents are designed to be used in a parts washing cabinet for individual component cleaning. For safety, use only nonflammable or high flash point solvents.

Gasket Sealant

Sealants are used in combination with a gasket or seal and are occasionally used alone. Follow the manufacturer's recommendation when using sealants. Use extreme care when choosing a sealant different from the type originally recommended. Choose sealants based on their resistance to heat, various fluids and their sealing capabilities.

One of the most common sealants is RTV, or room temperature vulcanizing sealant. This sealant cures at room temperature over a specific time period. It allows the repositioning of components without damaging gaskets.

Moisture in the air causes the RTV sealant to cure. Always install the tube cap as soon as possible after applying RTV sealant. RTV sealant has a limited shelf life and will not cure properly if the shelf life has expired. Keep partial tubes sealed, and discard them if they have surpassed the expiration date.

Applying RTV sealant

Clean all old gasket residue from the mating surfaces. Remove all gasket material from blind threaded holes; it can cause inaccurate bolt torque. Spray the mating surfaces with aerosol parts cleaner, and then wipe them with a lint-free cloth. The area must be clean for the sealant to adhere.

Apply RTV sealant in a continuous bead, 2-3 mm (0.08-0.12 in.) thick. Circle all the fastener holes unless otherwise specified. Do not allow any sealant to enter these holes. Assemble and tighten the fasteners to the specified torque within the time frame recommended by the RTV sealant manufacturer.

Gasket Remover

Aerosol gasket remover can help remove stubborn gaskets. This product can speed up the removal process and prevent damage to the mating surface that may be caused by a scraping tool. Most



of these products are very caustic. Follow the gasket remover manufacturer's instructions for use.

Recycling

Do-it-yourself maintenance and repair comes with a responsibility to properly dispose of vehicle and shop waste products. These include: engine and transmission oils, oil filters, coolant (a petroleum product), hydraulic fluids, batteries and any cleaning chemicals. Many local and regional organizations provide collection centers for these waste products.

Threadlocking Compound

A threadlocking compound is a fluid applied to the threads of fasteners. After tightening the fastener, the fluid dries and becomes a solid filler between the threads. This makes it difficult for the fastener to work loose from vibration, or heat expansion and contraction. Some threadlocking compounds also provide a seal against fluid leaks.

Before applying threadlocking compound, remove any old compound and oil residue from both thread areas and clean them with aerosol parts cleaner. Use the compound sparingly. Excess fluid can run into adjoining parts.

Threadlocking compounds are available in different strengths. Follow the particular manufacturer's recommendations regarding compound selection. A number of manufacturers offer a wide range of threadlocking compounds for various strength, temperature and repair applications.

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